

# Technology and Design Learning Area

## Introduction

The **Technology and Design Learning Area** equips learners to apply knowledge, experiences and resources purposefully to critique, design and make products, processes and systems. These are created to solve a problem or meet a need. Some examples of current technologies include medical procedures, housing, household products and appliances, electronic equipment, tools, recreation and leisure products, fads and children's toys. These can enhance lives and empower people, eg laser eye surgery, motorised wheelchairs, communication and media systems, and medical research. The use or abuse of technology can create social differences, disagreements and ethical conflicts, eg genetically modified foods, in-vitro fertilisation technology. While designing, developing and using technology is linked to the evolution of our species, our future existence will be influenced greatly by technologies currently being, or yet to be, designed and created. Consequently, responsible and democratic decision-making, taking into account cultural, societal and environmental factors, is an important aspect of Technology and Design. **Note:** *Technology and Design is often confused with Computer Technology, Information Communication Technology or Learning Technologies. Computer Technology is one of many learning tools used in the 'design processes' of Technology and Design.*

In a supportive environment, technically literate learners

- become increasingly confident, self-sufficient and independent in using a range of materials, components and resources, information systems, techniques and equipment effectively and safely to design and make products, processes and systems relevant to real life experiences and with practical applications
- examine critically the impact of past and present technologies in the home, commercial enterprise and local and global environments, and develop understandings about the role, range and effects of technologies on society and the environment.
- develop a solid repertoire of creative thinking, risk-taking, decision-making, problem-solving and communication skills to develop innovative and original solutions.

The interconnected phases of any technology include process commence with **defining the problem - the intent or purpose of the design**. A design brief defines the purpose or intent of the new or innovated product, process and system development. This is followed by the three inter-related strands:

## Critiquing

**Elements: Evaluate, Impact, Communicate**

Critiquing can be the initial or ongoing analysis, assessment and **evaluation** of a product, process or system against the original intent or problem. It can also be an ongoing process involving deconstructing either a new or existing product, process or system. It is important to recognise technological practice as both beneficial and problematic, and that every technology can have both positive and negative attributes, **impacts** or consequences. Making decisions during the critiquing process often involves active and vigorous debate, compromise, consensus and **communication** at various stages of the cycle, and is influenced by

- intent of the new technology and both the predicted and actual impact
- values, experiences, political and religious beliefs of different people and communities
- processes by which the decisions are made.

## Designing

**Elements: Investigate, Options**

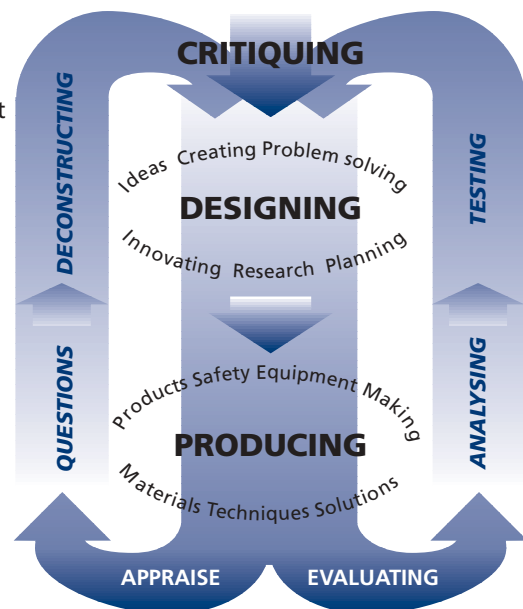
The design process is fundamental to the development and understanding of technology, and learners are exposed to a rich variety of strategies. Designing uses imagination, creativity, risk-taking and problem-solving skills to

**investigate**, plan, generate, synthesise and realise ideas. The goal might be to design and produce an entirely new technology but it might also mean making an existing product, process or system better. Analysing variables and identifying **options** possible solutions are explored, and thoughts and processes are recorded and communicated.

## Producing

**Elements: Materials, Skills and Techniques, Systems**

The production phase is the link between the thought processes of design and the reality of a product, process or system. Learners acquire detailed knowledge of the properties, potential and effectiveness of many **material** components and equipment and they understand the energies that make objects work (heat, wind, solar, electrical, chemical and mechanical). They select equipment from specific areas of technology and develop a rich repertoire of **skills and techniques** to respond to the design brief in a practical, achievable and safe way. They also plan and manage the sequential steps of production processes to create quality products and **systems**.

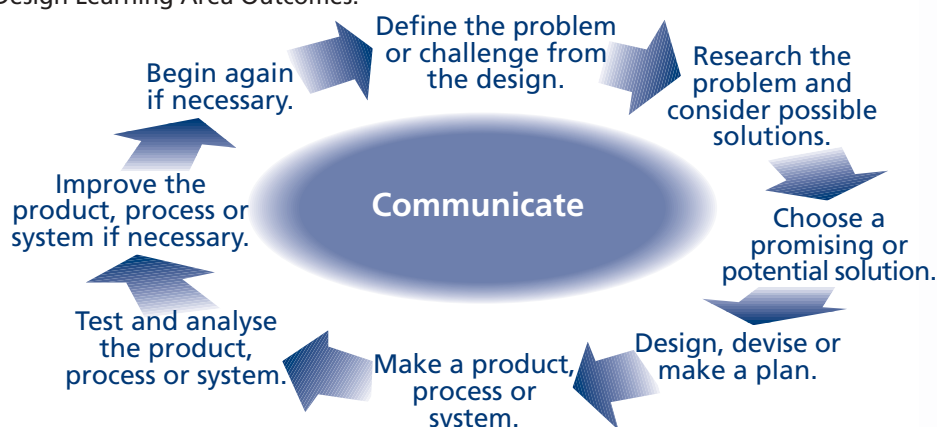


## Linking the theory and the practical

Practical implementation of Technology and Design might progress in a classroom as follows. Depending upon the stages of schooling, different aspects might be negotiated as part of a group exercise, or involve the students in highly complex and independent research and decision-making. For example, an exercise in 'researching the problem' might be done as part of a class discussion in early years classes, but be part of an independent analysis and research in secondary classes.

## Indigenous perspectives and the Technology and Design Learning Area

The Indigenous perspectives in this learning area can only be realised through collaborative partnerships with schools and local Indigenous people/organisations. They are intended to show the links, the points of connection and the points of difference between Indigenous traditional and contemporary cultures and the Technology and Design Learning Area Outcomes.



## Strand Overview

The different stages of schooling are reflected in Technology and Design.

KGP 1 to Band 1	Bands 2 and 3	Band 4 to Beyond Band 5
One strand - all strands and elements are integrated	One strand - all strands are integrated and specific elements begin to appear	Three distinct strands - Designing, Producing and Critiquing and associated elements
Investigate	Investigate	<b>Designing</b> <ul style="list-style-type: none"> <li>Investigate</li> <li>Options</li> </ul>
Options - Materials, Skills and Techniques	Options - Materials, Skills and Techniques	<b>Producing</b> <ul style="list-style-type: none"> <li>Materials</li> <li>Skills and Techniques</li> <li>Systems</li> </ul>
	Systems	
Evaluate, Impact and Communicate	Evaluate and Impact	<b>Critiquing</b> <ul style="list-style-type: none"> <li>Evaluate</li> <li>Impact</li> <li>Communicate</li> </ul>
	Communicate	

Strands and Links	Learners demonstrating evidence of KGP 1	Learners demonstrating evidence of KGP 2	Learners demonstrating evidence of KGP 3	Learners demonstrating evidence of Band 1
<b>Designing, Producing &amp; Critiquing</b>	<p><b>DPC KGP1.1 Investigate</b> attend to, anticipate, respond to, initiate interaction with and explore stimuli using the senses (auditory, visual, tactile and/or kinaesthetic)</p> <p><b>DPC KGP1.2 Options - Materials, Skills and Techniques</b> use basic materials, skills and techniques safely</p> <p><b>DPC KGP1.3 Evaluate, Impact and Communicate</b> communicate in appropriate ways about own actions.</p>	<p><b>DPC KGP2.1 Investigate</b> explore materials, resources, techniques and strategies to express possibilities in basic problems</p> <p><b>DPC KGP2.2 Options - Materials, Skills and Techniques</b> use a range of basic materials and equipment safely to undertake simple production processes, with direction</p> <p><b>DPC KGP2.3 Evaluate, Impact and Communicate</b> play with a range of resources and communicate about own discoveries.</p>	<p><b>DPC KGP3.1 Investigate</b> explore a wide range of materials, resources, techniques and strategies for the possibilities they offer in a design problem</p> <p><b>DPC KGP3.2 Options - Materials, Skills and Techniques</b> use a range of familiar materials/processes and equipment safely to undertake simple production processes</p> <p><b>DPC KGP3.3 Evaluate, Impact and Communicate</b> share ideas and express opinions about own ideas and products/processes/systems in familiar environments.</p>	<p><b>DPC 1.1 Investigate</b> explore the suitability of a variety of materials, skills and techniques and describe the design possibilities</p> <p><b>DPC 1.2 Options - Materials, Skills and Techniques</b> use materials, skills and techniques safely, giving reasons for choices, and plan production processes for making simple products</p> <p><b>DPC 1.3 Evaluate, Impact and Communicate</b> explain own design processes and describe the features and uses of familiar products/processes and systems.</p>

	Learners demonstrating evidence of Band 2	Learners demonstrating evidence of Band 3
<b>Designing, Producing &amp; Critiquing</b>	<p><b>DPC 2.1 Investigate</b> examine the suitability of key design features of familiar products/processes/systems when determining design possibilities</p> <p><b>DPC 2.2 Options - Materials, Skills and Techniques</b> recognise practical and safety constraints of basic materials, skills and techniques in an intended product</p> <p><b>DPC 2.3 Systems</b> plan and carry out the steps of a production process</p> <p><b>DPC 2.4 Evaluate and Impact</b> identify a range of criteria to discuss and appraise products/processes/systems in familiar environments</p> <p><b>DPC 2.5 Communicate</b> explain and share the design process using some technical language.</p>	<p><b>DPC 3.1 Investigate</b> explore design briefs and production proposals for identified users</p> <p><b>DPC 3.2 Options - Materials, Skills and Techniques</b> make choices based on safety, functional and aesthetic factors and give some consideration to social/environmental factors to meet design brief requirements</p> <p><b>DPC 3.3 Systems</b> organise and implement a production process to own specifications</p> <p><b>DPC 3.4 Evaluate and Impact</b> describe the relationships and impact of products/processes/systems and the community/environment</p> <p><b>DPC 3.5 Communicate</b> explain and share the design process using appropriate technical terminology.</p>

Learners demonstrating evidence of <b>Band 4</b>	Learners demonstrating evidence of <b>Band 5</b>	Learners demonstrating evidence of <b>Beyond Band 5</b>	<b>Strands and Links</b>
<p><b>De 4.1 Investigate</b> examine design briefs to develop production proposals that take into account the needs of intended users</p> <p><b>De 4.2 Options</b> explain the functional, aesthetic, social and environmental factors in design choices.</p>	<p><b>De 5.1 Investigate</b> investigate and analyse how needs, resources and circumstances affect the scope of implementation of a design brief</p> <p><b>De 5.2 Options</b> explore alternatives and justify functional, aesthetic, social and environmental design choices.</p>	<p><b>De 5+1 Investigate</b> analyse the design brief and investigate the development and promotion of a range of products and processes to maximise opportunities for innovation</p> <p><b>De 5+2 Options</b> demonstrate innovation in approach and justify intended design proposals.</p>	<p><b>Designing</b></p> <p><b>Links</b></p> <p><b>EsseNTial Learnings:</b> Creative Learner, Constructive Learner</p> <p><b>Learning Areas:</b> HPE, Science, SOSE, The Arts</p> <p><b>Perspectives:</b> Literacy, Numeracy, Learning Technology, Vocational Learning</p>
<p><b>Pr 4.1 Materials</b> select from a defined range of materials considering properties, aesthetics and origins</p> <p><b>Pr 4.2 Skills and Techniques</b> use appropriate equipment and practices to achieve defined standards of quality and safety</p> <p><b>Pr 4.3 Systems</b> organise, implement and adjust production processes.</p>	<p><b>Pr 5.1 Materials</b> select appropriate materials with understanding of properties, aesthetics, economics and sustainability</p> <p><b>Pr 5.2 Skills and Techniques</b> demonstrate high level skills using specialised equipment to produce to specified standards of quality and safety</p> <p><b>Pr 5.3 Systems</b> organise, implement and adjust production processes to defined standards of quality.</p>	<p><b>Pr 5+1 Materials</b> explain properties and structure of materials in terms of function, aesthetics, economics and environment</p> <p><b>Pr 5+2 Skills and Techniques</b> use specialised skills and modify techniques and apparatus to achieve specified functional and aesthetic outcomes</p> <p><b>Pr 5+3 Systems</b> modify techniques to assemble and control complex systems to meet performance requirements.</p>	<p><b>Producing</b></p> <p><b>Links</b></p> <p><b>EsseNTial Learnings:</b> Cr 1, Cr 2, Constructive Learner</p> <p><b>Learning Areas:</b> HPE, Science, SOSE, The Arts</p> <p><b>Perspectives:</b> Literacy, Numeracy, Learning Technology, Vocational Learning</p>
<p><b>Cr 4.1 Evaluate</b> reflect on and assess products/processes/systems according to specified design requirements</p> <p><b>Cr 4.2 Impact</b> consider the appropriateness and effects of products and systems on a community/environment</p> <p><b>Cr 4.3 Communicate</b> explain and present design proposals incorporating appropriate technical terminology.</p>	<p><b>Cr 5.1 Evaluate</b> analyse, assess and modify, if necessary, the products/processes/systems involved in design and production from inception to completion</p> <p><b>Cr 5.2 Impact</b> report on the use of products/processes/systems and the impact on the community/environment</p> <p><b>Cr 5.3 Communicate</b> present own design proposal requiring technical competence of skills and adopting technical terminology to show creation and development of ideas.</p>	<p><b>Cr 5+1 Evaluate</b> evaluate critically the effectiveness of techniques, resources and processes used to design and produce intended product or system</p> <p><b>Cr 5+2 Impact</b> analyse and report on the short and long term consequences of a product or process on particular environments and cultures</p> <p><b>Cr 5+3 Communicate</b> create and present detailed design and production proposals in technical and non-technical forms, appropriate to audience.</p>	<p><b>Critiquing</b></p> <p><b>Links</b></p> <p><b>EsseNTial Learnings:</b> In 1, Cr 1, Cr 2, Constructive Learner</p> <p><b>Learning Areas:</b> HPE, Science, SOSE, The Arts</p> <p><b>Perspectives:</b> Literacy, Numeracy, Learning Technology, Vocational Learning</p>

# Designing, Producing and Critiquing

## Links

### EsSENTial Learnings:

In 1, Cr 1, Cr 2,  
Con 1, Con 2

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Vocational  
Learning

## OUTCOMES

Learners demonstrating evidence of **Key Growth Point 1**

### DPC KGP1.1 Investigate

attend to, anticipate, respond to, initiate interaction with and explore stimuli using their senses (auditory, visual, tactile and/or kinesthetic)

### DPC KGP 1.2 Options - Materials, Skills and Techniques

use basic materials, skills and techniques safely

### DPC KGP 1.3 Evaluate, Impact and Communicate

communicate in appropriate ways about own actions.

## INDICATORS

Learners demonstrating evidence of **Key Growth Point 1** for example

### Investigate

- be curious about new resources or materials in a familiar environment
- investigate the attributes of a variety of materials, eg feathers, toothpicks, straws, paddle pop sticks, paper shapes, confetti, silver foil, slimy play dough, clay, sand
- develop basic skills with support and prompting as necessary, eg cut, paste, attach, roll, pinch, tear
- make use of familiar materials, resources or processes to create things to play in and with, eg water or sand play, role play, construction, craft activities, music/dance, number and space activities
- use tools or materials in ways other than their traditional use, eg a potato masher to mash potatoes but also to mash play dough, play in a wading pool full of ping pong balls
- explore equipment that appeals to different sensory needs, eg fibre optic lights, vibrating cushions, bells
- inspect and communicate the key components inside familiar equipment, eg look inside a clock for the batteries, untwist a lid to get inside a jar, pour water through a waterwheel and indicate where the water has gone in and out of the system
- explore concepts and ideas through own interests and teacher directed activities.

### Options - Materials, Skills and Techniques [Num-SS]

- demonstrate selecting and rejecting behaviours and/or language when choosing materials that suit task
- interact with peers and express own preferences by behaviour and/or with language for specific materials or processes, eg preference to stir the pikelet batter, choose the red stars, select the fat paint brush, play with the lavender scented play dough, use counters or blocks in number recognition tasks
- identify and collect needed or wanted materials/equipment for specific tasks, eg scissors to cut, rolling pin or cylinder to roll out play dough, stapler, glue or sticky tape to attach
- select appropriate actions to task, eg cut, grate and mix ingredients in meal preparation activities; put jigsaw pieces into simple shape puzzle; activate a tool to make a design on paper such as swirl art; locate and put on hat before going outside, or put bag in bag space and enter classroom
- select pictures or symbols that best describe a task, eg cut, paste, count
- follow simple procedures in art and craft activities, eg craypas/oil pastel drawing with a paint or dye wash, make a card for a special occasion, print wrapping paper
- utilise appropriate language and actions to indicate the sequence of steps involved in a specific activity, eg 'First we..., then we....' **[Num-MDS]**
- follow simple instructions when learning a new skill, eg swimming, gymnastics, cutting food, gathering food, fishing.

### Evaluate, Impact and Communicate

- answer basic questions relating to size (big, small), location (here, there) or colour of products
- respond to different colours, shapes and patterns within functional activities, eg yellow cup on black desk, strip pattern on class window, bright cover on story book **[Num-SS]**
- react to a video of themselves involved in a task
- use a switch to respond to stimuli
- indicate or answer appropriately to questions about their role in group technology tasks, eg 'What did you get?', 'Where is the glue?', 'How did you and (friend) put the blocks together?' **[Lit-LS]**
- communicate feelings about task, eg select between two 'feelings' pictographs **[HPE-PD]**
- use visual/verbal cues to organise thinking/ actions, eg sequenced pictograph list.

# Designing, Producing and Critiquing

## OUTCOMES

Learners demonstrating evidence of **Key Growth Point 2**

### DPC KGP2.1 Investigate

explore materials, resources, techniques and strategies to express possibilities in basic problems

### DPC KGP2.2 Options - Materials, Skills and Techniques

use a range of basic materials and equipment safely to undertake simple production processes, with direction

### DPC KGP2.3 Evaluate, Impact and Communicate

play with a range of resources and communicate about own discoveries.

## INDICATORS

Learners demonstrating evidence of **Key Growth Point 2** for example

### Investigate [Sci-WS]

- play with materials and use a variety of skills to discover attributes, eg colours, textures and absorption of finger paint, musical instruments made of a variety of materials
- use materials and equipment relating to purpose, eg patty pans for muffin mixture, a rolling pin to roll playdough or clay, bean bags and buckets for a perceptual motor activity, musical instruments to make sound effects, CD player or cassette player, counters in Number Sense activities
- explore various materials for the sensory experiences they offer, eg grainy play dough, satin fabric and fake fur, ice cubes and warm water, jelly and porridge, vinegar, coffee and pot pourri
- use familiar resources and tools in unfamiliar ways, eg coloured glue to create textural effects, finger-painting with coloured shaving foam, flour and water to make a paste, recycled materials into a collage
- choose specific products to suit the task, eg a telephone, kettle or spade in given play situations, a picnic with appropriate food in home corner, a bridge made out of construction materials
- tinker with gadgets to investigate and describe what they are made of and how they go together, eg keyboards, telephones, remote control toys
- describe how they solved a basic problem and the difficulties encountered, eg materials needed to make a mask for a class presentation, decisions about size and colours of a clay pot for a present
- explore local bush materials and discuss what they can be used for



### Options, Materials, Skills and Techniques

#### [Num-SS] [Num-MDS]

- choose and use materials based on characteristics, eg specific shapes in pattern making activities, appropriately sized ball for throwing and catching game, magnet 'fish' in fishing game, fishing line, string
- use selecting and rejecting language when choosing materials that suit, eg 'I don't like that glue.' 'I want those stars.'
- select and use basic equipment and skills safely, eg colour, staple, hammer, screw, pour, fold, trace, manipulate
- express ideas through construction of appropriate products, eg special event cards, creation of props associated with particular characters in texts, class play costumes or masks
- generate ideas by talking about the design, and the design process using own and other people's experiences to develop ideas
- ask questions relating to size, shape, colour and purpose of materials/resources
- construct a simple object or product following teacher's instructions, eg hand puppet, pop-up card
- follow a sequence of pictures/symbols to complete a task, eg button up a shirt, tie shoelaces, make play dough.

### Evaluate, Impact and Communicate

- describe how familiar objects and products were used, eg 'I put the red blocks beside the blue ones.' 'I saw the pencils float.' 'This is where I stuck the cotton ball on the bunny's tail.'
- ask and answer questions about products and processes used in activities, eg 'What was that used for?' 'How did you use it?' 'Where did you find it?' 'What did you do to make it?' **[Lit-LS]**
- describe the relationship between materials, resources or products and processes, eg 'I made the robot arms move.' 'We put the batter in the frying pan and then we ate it.' 'We made a fishing net.'
- answer questions to describe and enhance the product or process, eg 'How might you make this fly/swim/crawl/get higher...?' 'Which part will do the most work?' 'What will happen if...?'
- show familiarity and pride in work/play environment and assess own work to own standards, comments or products with peers, family and teacher **[In 2]**
- explain their role in cooperative technology tasks, eg 'I got the string and glue.' 'I did all the sticking.' 'I had a good idea.' **[Lit-LS] [LT-P] [Col 3]**
- share what happened directly after construction or production was completed, eg 'I made a car out of Lego and I made it go.' 'I painted a picture. I gave it to mum.' 'I made a house. It fell down.'

## Links

### EsseNTial Learnings:

In 1, Creative Learner, Con 1, Con 2

### Learning Areas:

HPE, Science, SOSE, The Arts

### Perspectives:

Literacy, Numeracy, Vocational Learning

# Designing, Producing and Critiquing

## Links

### EsSENTial Learnings:

In 1, Creative Learner, Con 1, Con 2

**Learning Areas:**  
HPE, Science, SOSE, The Arts

**Perspectives:**  
Literacy, Numeracy, Vocational Learning

## OUTCOMES

Learners demonstrating evidence of **Key Growth Point 3**

### DPC KGP3.1 Investigate

explore a wide range of materials, resources, techniques and strategies for the possibilities they offer in a design problem

### DPC KGP3.2 Options - Materials, Skills and Techniques

use a range of familiar materials/processes and equipment safely to undertake simple production processes

### DPC KGP3.3 Evaluate, Impact and Communicate

share ideas and express opinions about own ideas and products/processes/ systems in familiar environments.


## INDICATORS

Learners demonstrating evidence of **Key Growth Point 3** for example

### Investigate [Sci-WS]

- examine, classify and discuss key attributes and purposes of both familiar and unfamiliar materials, tools and resources, eg describe a selection of items from a 'Mystery Box'
- make decisions about which tool/ technique is needed, eg scissors to cut, rolling pin to make play dough flat
- use familiar resources and materials in unfamiliar ways, eg make slimy playdough, make coloured sand pictures, cord/string painting, vegetable sculptures, old clean socks as puppets, 'junk box' construction
- share the processes of 'tinkering', eg observing, taking apart, putting back together, trialing new ways of putting the 'bits' together with appropriate tools
- comment on how one material would improve the use of another, eg water added to sand for building: 'If we had water it would be better.'
- select suitable resources for specific tasks, eg cardboard instead of paper in construction, light weight fabric or paper for kites and parachutes, pulleys/gears to make a simple clothes line to dry art work
- describe and discuss a construction of a familiar environment, eg how the layout of wooden blocks represents rooms in their house, a 3D story map of a favourite fairy tale [LT-P]
- express opinions on innovative approaches, eg 'I really like how the boxes were used in that one...'

### Options - Materials, Skills and Techniques [Num-MDS]

- classify products according to specific criteria such as purpose, size, preference, movement, suitability
- discuss special safety rules, skills or conditions associated with different materials or equipment, eg scissors, electrical processes and electronic devices, hunting tools, ceremonial objects, [LT-O] 
- determine, search for and use materials and describe the product, process or system, eg big box to make a car, dress ups, boxes, tins and play money in the shop, chairs, a sheet to make a tent
- discuss ideas with peers and describe the planned design and production process
- use a variety of approaches when examining a basic problem, eg confer and brainstorm possibilities with friends, outline and record necessary steps, search for materials, try again if necessary
- attend to verbal and visual instructions for the processes they offer, eg thread paper strips or wool using over and under technique, make a simple sandwich or fruit salad, follow a roster to look after classroom plants

### Evaluate, Impact and Communicate

- consider the implications of own ideas, eg 'Would my bird house meet the needs of the birds in the aviary?'
- identify and discuss why specific products and processes have been chosen, eg CD player for CDs, mouse pellets to feed the mice, scissors to cut paper, ingredients in a recipe, paper mache for a mask
- express opinions using own criteria, eg 'That one is the biggest.' 'This one has the most eyes.' 'The highest one is over there.'
- ask questions and share observations about products or processes with peers, family and teacher, eg 'I like the colours on that card.' 'I tried to stick the matchsticks on but the glue wasn't strong enough.'
- draw a design before making and trial materials to be used, eg check to see that some polyhedron shapes join together before making a 3-dimensional house [LT-R]
- predict how products and processes could be improved within scope of task, eg 'Which part will...?' 'How will...?' 'How might...?'
- describe and reflect on the use of specific materials in producing own ideas, eg 'I tried to push the matchsticks on but I needed something bigger like paddle pop sticks.'
- reflect on roles of self and others in cooperative group technology tasks, eg 'I liked getting the paper and stapler.' 'I asked the teacher to help me stick the pins in.' [Col 3]
- write a simple procedure/ draw the steps involved in making a simple familiar product, eg pop corn, ice blocks
- assess and communicate the degree of completion of own work, eg 'I will be finished this soon.'

# Designing, Producing and Critiquing

## OUTCOMES

Learners demonstrating evidence of **Band 1**

### DPC 1.1 Investigate

explore the suitability of a variety of materials, skills and techniques and describe the design possibilities

### DPC 1.2 Options - Materials, Skills and Techniques

use materials, skills and techniques safely, giving reasons for choices, and plan production processes for making simple products

### DPC 1.3 Evaluate, Impact and Communicate

explain own design processes and describe the features and uses of familiar products/processes and systems.


## INDICATORS

Learners demonstrating evidence of **Band 1** for example

### Investigate [Sci-WS]

- describe special characteristics of different objects or systems, eg paper, balsa wood, clothing of a firefighter
- investigate and describe how some materials and equipment such as glue, staples, masking tape and pins are suitable for joining other materials, eg paper, plastic, cardboard, foam
- explore the working characteristics of materials, eg plaiting yarn to make it stronger
- combine familiar materials and test their properties to create new products or processes, eg blotting paper prints, self-watering plant pot, spring-based jack-in-the-box, packaging for a fragile item
- examine how mechanisms can be used in different ways, eg wheels/axles, joints that allow movement
- investigate and discuss which materials best fulfil a specific function, eg 'The big blocks are good at the bottom.' 'The bucket is better for carrying water than the flowerpot.' **[Num-SS]**
- take apart an object and use parts to create a new object, eg dismantle a telephone and computer keyboard and use the parts in making a robot, undo packages or boxes and use as a template to make own **[LT-O]**
- generate options in response to open-ended design problems, eg device to make Tiddalik the Frog laugh
- identify materials used in making traditional items, eg twine, baskets, mats 

### Options - Materials, Skills and Techniques [Num-MDS]

- use familiar materials in different ways, reflecting on and discussing the process, eg redesign the classroom, create a new cereal box better suited to students of this age
- choose and use specific materials, processes or systems needed to complete tasks, eg dress ups and props, structures, construction or craft materials
- use common tools and shared equipment in the classroom safely and carefully, eg hole punch, screw driver
- classify materials and make the links to possible uses of these materials in work or play **[LS]**
- work collaboratively with peers to generate designs and produce them **[Col 3]**
- identify similarities and differences between familiar systems, eg communication - letter, email and telephone, multimedia stories and books **[LT-P]**
- carry out a short sequence of steps to assemble and operate a system, eg make a greeting card with movable internal parts, take part in small group assembly line production of a simple lunch
- plan and create simple systems, eg a vehicle that moves when pushed or pulled
- follow own steps in a process to develop systems, eg make simple spinners, use levers and a fulcrum to make a model of a see-saw or a catapult, a roster system for feeding a class pet
- collect bush materials to make a traditional item, with support from an Indigenous artist 

### Evaluate, Impact and Communicate

- examine the successes and failures of designs and production for future possibilities
- show preferences for some materials and explain why they should be used, eg paper cuts, slots or hinges to join paper and card, different materials inside musical shakers
- identify different approaches or improvements to products, processes or systems
- ask questions and share observations to clarify, describe, confirm and plan the design brief, design and production proposals
- trial different materials in the development of systems and reflect on effectiveness, eg different sizes, shapes
- share assessments of own work based on negotiated criteria, eg functionality, ease of completion, aesthetics
- report on the effectiveness of cooperative group strategies and task processes **[Col 3]**
- write, draw and share the key steps involved in making a familiar product, eg recipe, tie dyeing
- give reasons why one product is preferred over another and describe the benefits of that product
- recount and record the materials or resources necessary to complete a task
- label own sketches to show the parts of their completed design, eg a boat, rocket, imaginary tool
- develop sequence maps and plans for individuals and groups to complete a familiar task, eg class roster for morning news, making a healthy meal **[LT-P]**.

## Links

### EsseNTial Learnings:

In 1, Creative Learner, Con 1, Con 2, Con 3

### Learning Areas:

HPE, Science, SOSE, The Arts

### Perspectives:

Literacy, Numeracy, Vocational Learning

# Designing, Producing and Critiquing

## Links

### EsSENTial Learnings:

Creative Learner,  
Constructive Learner

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Vocational Learning

## OUTCOMES

Learners demonstrating evidence of **Band 2**

### DPC 2.1 Investigate

examine the suitability of key design features of familiar products/processes/systems when determining design possibilities

### DPC 2.2 Options - Materials, Skills and Techniques

recognise practical and safety restraints of basic materials, skills and techniques in an intended product

### DPC 2.3 Systems

plan and carry out the steps of a production process

### DPC 2.4 Evaluate and Impact

identify a range of criteria to discuss and appraise products/processes/systems in familiar environments



### DPC 2.5 Communicate

explain and share the design process using some technical language.


## INDICATORS

Learners demonstrating evidence of **Band 2** for example

### Investigate [Sci-WS]

- analyse the materials needed in a design proposal, eg to make a stable frame structure, simple gear systems
- identify key functional and aesthetic features of technological ideas, techniques and practices 
- explain how mechanisms can be used in different ways, eg moving joints, construction kits
- alter familiar materials to change the end product, eg add chocolate to a basic recipe
- classify according to criteria such as functionality or aesthetics, eg furniture, children's toys, classroom tools
- take apart technology, eg dead mobile phone, keyboard, typewriter, adding machine, telephone, electrical circuit boards, small motors, solar panels remote control toys **[LT-O]**
- select a preferred option from research into design brief requirements, and justify the approach taken to develop solutions
- decide on appropriate strategies when a design fails, eg try a different approach, different materials, ask a friend for assistance **[LT-R]**
- work collaboratively with Indigenous artists/designers to explore traditional technological expertise, knowledge and skills .

### Options - Materials, Skills and Techniques [Num-MDS]

- explore characteristics of various materials, and make informed decisions about their use, eg paper, timber, plastics, metal, natural materials such as bark, sticks, grasses, seed pods or clay 
- use familiar complex tools and equipment safely and for their intended purpose, eg computer peripherals, public address system, screen printing, slicing, dyeing, hammering, cooking **[LT-O]**
- research the best options for design possibilities and limitations, eg select a variety of scented and textured plants to see which is preferred by a visually impaired person in a new garden **[LT-R]**
- make things from a range of familiar resources, using a variety of strategies, tools and, discussing the design and production process, eg musical instruments such as clap sticks, didgeridoo, kulup, djambu 
- propose individual and group plans to complete a task to specifications **[Col 3]**.

# Designing, Producing and Critiquing

## Links

### EsseNTial Learnings:

Creative Learner,  
Constructive Learner

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Vocational Learning



## INDICATORS

Learners demonstrating evidence of **Band 2** for example

### Systems [Sci-CC]

- investigate the role of systems in everyday life **[LT-S]**
- identify familiar production processes in class or home environment, eg simple patchwork, meal preparation, paper mache, tie dyeing
- identify the energy sources that make systems work, eg solar, electrical, wind
- improve or change systems and reflect on the consequences, eg organise a different class system of getting student books marked by teacher, debate the pros and cons of a bicycle track in a school environment
- negotiate and develop design and production proposals
- follow a plan or instructions to construct a working model, eg Technic Lego system, rocket, paper aeroplane
- identify, label and record all necessary steps to create a process or system and to fulfil design brief, eg moving models using wheels and axles; the base, circuitry and wand of a 'steady hand' game **[LT-P]**.

### Evaluate and Impact [LT-S]

- ask questions and conduct a survey to assess the advantages and disadvantages of using a certain product, eg a range of different types of cups for serving drinks at a drink stall
- discuss how common objects can be used for a variety of purposes, dependent on specific safety, aesthetics, and functionality criteria
- share preferences for specific products, processes or systems, eg recycled products versus 'use only once' products, safety aspects of playground equipment
- trial a new system and communicate its effectiveness according to negotiated criteria, eg controlling traffic flow at the canteen, rostering playground play areas  
- compare and contrast similarities and differences between familiar systems, eg letters and emails, different remote control toys **[LT-P]**
- evaluate the effectiveness of investigative approaches to design problems, eg research, questioning techniques, surveying, trial and error, cooperative strategies **[LT-R]**
- make and share simple judgments about outcomes (results).

### Communicate [Lit-LS] [Lit-W]

- explain how parts of a design or system interconnect and work together, eg a puppet, gear systems
- develop design proposals as part of a group and describe the process
- analyse what has been accomplished to see if a new design meets identified needs
- select, draw or detail own ideas for familiar events, eg decorations/games for a class party, draw a birds-eye view of a bedroom **[Num-SS] [Arts-CrA]**
- use magazine clippings and pictures to create a visual sequence of the stages for developing a product and produce a written text to match visuals, eg building a house, shade shelters **[Arts-CrA]**.

# Designing, Producing and Critiquing

## Links

### EsSENTial Learnings:

Creative Learner,  
Constructive Learner

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Learning Technology,  
Vocational Learning

## OUTCOMES

Learners demonstrating evidence of **Band 3**

### DPC3.1 Investigate

explore design briefs and production proposals for identified users

### DPC3.2 Options - Materials, Skills and Techniques

make choices based on functional and aesthetic factors and give some consideration to social/environmental factors to meet design brief requirements

### DPC3.3 Systems

organise and implement a production process to own specifications

### DPC3.4 Evaluate and Impact

describe the relationships and impact of products/processes/systems and the community/environment




### DPC3.5 Communicate

explain and share the design process using appropriate technical terminology.

## INDICATORS

Learners demonstrating evidence of **Band 3** for example

### Investigate [Sci-WS]

- analyse possible materials and some of the products, processes or systems that might be developed, eg circuit board for a damp detector, link mechanisms
- examine skills and techniques needed to fulfil design brief requirements
- identify key functional, aesthetic and social features of technological ideas and practices  
- explore the potential of materials needed, eg a musical instrument that can be tapped or plucked to make different tones, eg wind chimes, tongue drums, traditional musical instruments
- combine materials to develop understanding of simple pneumatics or structures for an identified purpose
- choose features to be included in a design proposal and explain the choices, eg use information obtained from a class survey to develop a key ring tag
- use a flexible but persevering approach to working with a design brief and a variety of materials and resources, ensuring that collaborative work can occur at various entry points in the process [In 5] [Col 3]
- explore past, present and possible future innovations as they pertain to technology [In 6]
- examine how the context of various Indigenous communities influences concepts and applications of different technologies, eg remote community living .

### Options - Materials, Skills and Techniques [Num-MDS]

- describe processes and techniques used to manipulate a range of materials to meet design challenges
- select more complex materials and tools safely to complete a task and meet design brief requirements, eg build an animal enclosure, glue gun, sewing machine, photographic equipment
- present the advantages and disadvantages of their design to their peers, eg for a new classroom
- select used or recycled materials to meet own or other's design specifications
- translate perceived needs into design goals to guide own work, eg design and construct models of shade systems for plants, ceremonies, develop a solution for packaging astronaut's food
- conduct research in order to generate a design brief, eg building architecture, aesthetics and safety features before designing a new school entrance or a new playground area in a remote locality
- develop simple production plans from design proposals, eg design shade structures for students for a school Sports Day, modify a recipe
- create a single proposal from multiple ideas/possible solutions and explain the choice, eg use hydraulics in a puppet theatre stage, demonstrating its smooth operation over other mechanisms
- negotiate role within groups and develop time management plans in the form of tables or flow charts [Col 3].

# Designing, Producing and Critiquing

## Links

### EsseNTial

#### Learnings:

Creative Learner,  
Constructive  
Learner

#### Learning Areas:

HPE, Science,  
SOSE, The Arts

#### Perspectives:

Literacy,  
Numeracy,  
Learning  
Technology,  
Vocational  
Learning


## INDICATORS

Learners demonstrating evidence of **Band 3** for example

### Systems [Sci-CC]

- identify the components and the relationships between these in range of simple systems
- try out different options when examining systems, eg simple electrical circuits in illuminated Christmas scenes, different energy sources
- identify and describe the energy sources that make systems work, eg solar, electrical, wind
- assess the roles of people in the operation of systems
- explain the steps in a system they have devised, eg operating school canteen, organisation of a car wash, lifting machines using pulleys and gears, adding in variations to common recipes
- generate own ideas about systems and communicate this information, eg bird feeding system for a variety of birds, transport and communication of the future.

### Evaluate and Impact [LT-S]

- match outcomes (results) with original intentions and needs in design proposals, eg develop further safety aspects for a skate park, animal enclosure
- use a set of criteria based on aesthetics, purpose and task suitability when considering the effectiveness of materials, eg consider a range of fabrics that represent furnishings in a model set design, tensile strength of metal components
- describe the relationships between products, processes and systems, eg the effect of climate, culture and resources on the designs of different forms of shelter; the voting system and class elections 
- describe how products, processes and systems could be made better for intended users, eg plan, describe, trial and assess a healthy menu for school lunches
- evaluate cooperative group tasks (developing an equipment list, time plans and production proposals), eg setting up a class exhibition [Col 3].

### Communicate

#### [Col 1] [Lit-LS] [Lit-W]

- explain how the design and production processes are linked, eg prepare a roster for a range of duties for members of the design team [Col 3]
- produce and present a scale model of a simple familiar item, eg a bookshelf [Num-SS]
- draw and label a simple diagram or a 3-dimensional image, using appropriate symbols to represent an actual product, eg the wiring system of a battery powered torch, box with compartments [Num-SS]
- maintain an electronic journal or folio in which completed works, works in progress and stimulus materials can be stored [LT-P].

# Designing

## Links

### EsseNTial Learnings:

Creative Learner,  
Constructive Learner

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Learning Technology,  
Vocational Learning

## OUTCOMES

Learners demonstrating evidence of **Band 4**

### De 4.1 Investigate

examine design briefs to develop production proposals that take into account the needs of intended users

### De 4.2 Options

explain the functional, aesthetic, social and environmental factors in design choices.

## INDICATORS

Learners demonstrating evidence of **Band 4** for example

### Investigate [Sci-WS]

- agree on specific criteria to judge the effectiveness of a proposed solution, eg aesthetics, usefulness, suitability, ease of production
- examine technology processes and consider how applying technology can cause tension in society
- investigate the implications of alternative options and identify what is needed to implement a proposal
- examine changing lifestyles and work patterns and how these have affected the development of technology   
- design and produce a toy that used cam mechanisms (shaped and off-centre wheels)
- research, develop and modify a plan to suit own and others' preferences, eg the design of a spice rack, a range of fabric and fabric decorations or fastenings suitable for a pencil case, a range of foods for adolescents, propagation mixes for growing vegetable seedlings
- display a productive and critical approach to plans and proposals
- explore cooperatively a range of options in the development of production plans or design briefs, eg record breakfast food preferences, investigate cooking utensils and methods across different cultures
- identify and respect the role of others in group cooperation tasks, and the input (contribution) that others bring to problem solving, design and production **[Col 3]**
- research ways that Indigenous peoples are utilising advanced technologies to retain and strengthen their cultures, eg use of CD Rom for cultural storage, Tanami Network, remote area distance education 

### Options [Num-SM] [Num-CD]

- generate and justify design ideas including drawings and plans, eg use a selection of 3-dimensional annotated sketches to communicate different designs for a child's hand-held skill game
- make modifications to incorporate new ideas and justify choices, using appropriate criteria, eg fabric and fabric decorations for a pencil case, foods chosen for an adolescent for a weekend camping trip, packaging for a family breakfast promotion, the advantages and disadvantages of a range of propagation mixes for growing seedlings
- use a variety of criteria to select a design, eg difficulty of manufacture, impact, balance, colour and contrast in a clock face
- generate and develop ideas through the design and production processes
- demonstrate understanding that failed solutions can provide useful information for future approaches, eg different solutions in developing an alternate energy vehicle or a fun park cable car, appropriate housing in Indigenous communities
- work in groups to develop and follow time plans, eg prepare muffins, pick, sort and grade vegetables according to industry standards
- develop a folio while working through mini design briefs leading into a major project while investigating the concepts of reconciliation and body adornment.

# Designing

## OUTCOMES

Learners demonstrating evidence of **Band 5**

### De 5.1 Investigate

investigate and analyse how needs, resources and circumstances affect the scope of implementation of a design brief

### De 5.2 Options

explore alternatives and justify functional, aesthetic, social and environmental design choices

## Links

### EsseNTial Learnings:

Creative Learner,  
Constructive Learner

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Learning  
Technology,  
Vocational  
Learning

## INDICATORS

Learners demonstrating evidence of **Band 5** for example

### Investigate [Sci-WS]

- appreciate how pervasive technologies are from a local and global perspective, eg how materials and equipment have developed in different cultures and over time
- analyse the variables and relationships within intended products/processes/systems, eg genetically modified foods, impact of TV dinners on family life, prototypes for alternate systems of power production
- investigate and evaluate existing products, processes and systems, eg the design of a community airstrip, child-minding options, existing wind turbine models, fast reaction/computer games
- modify and vary designs as necessary to develop possibilities in response to the design brief, eg, a range of fencing materials suitable for Anglo Nubian goats, a remote controlled car park barrier
- examine the historical development of technologies from a local and global perspective, eg cameras, games
- draw on ideas from a wide range of sources and cultures
- examine the suitability and appropriateness of design proposals, eg use a thermoformer to mould plastic for a desktop tidy, health and safety issues in processing bush food, food preservation and hygiene implications in freezing and thawing sandwiches, most appropriate decorative samples
- use lateral thinking strategies to brainstorm and record useful processes and solutions
- find examples of situations where Indigenous communities and modern technology are consciously working together for cultural and social maintenance, eg Centre For Appropriate Technology in Alice Springs.

### Options [Num-SM] [Num-CD]

- investigate a range of options in the interpretation and expression of design briefs, eg natural, synthetic and blended fabrics with relation to their use in textile products; survey staff members to discover preferred prices, food preferences and portion sizes for a school based alfresco café
- modify and model alternate designs, eg a device for a person with a disability to turn on a tap
- advocate and defend the technical, aesthetic and ethical aspects of their design, eg a piece of furniture made from recycled materials
- propose and justify solutions that enhance the finished product, eg a safe and functional child's carry seat for an adult's bicycle, house design models, fencing materials which fit specified functional criteria
- analyse and graph the responses from peers and family members, eg the constraints and trade-offs in the production of plantation timbers
- develop alternative ideas considering previous discussions on criteria, eg different restaurant menus
- analyse the design brief, develop ideas through the design process and make a product, process or system that meets identified needs
- develop effective strategies for managing people and resources
- approach design and production proposals with flexibility and perseverance.

## Designing

### Links

#### EsseNTial Learnings:

Creative Learner,  
Constructive Learner

#### Learning Areas:

HPE, Science,  
SOSE, The Arts

#### Perspectives:

Literacy,  
Numeracy,  
Learning Technology,  
Vocational Learning

### OUTCOMES

Learners demonstrating evidence of **Beyond Band 5**

#### De 5+.1 Investigate

analyse the design brief and investigate the development and promotion of a range of products and processes to maximise opportunities for innovation

#### De 5+.2 Options

demonstrate innovation in approach and justify intended design proposals.

### INDICATORS

Learners demonstrating evidence of **Beyond Band 5** for example

#### Investigate [Sci-WS]

- research and record material and equipment options and process/product interactions in the development of design proposals, eg techniques or strategies relating to nutrient deficiencies of soil, the 'service component' of a range of food and hospitality enterprises 🐼
- modify and vary designs as necessary to develop possibilities in response to the design brief, eg the application of knock-down fittings in the furniture industry and how they influence the design outcome, the variety of commercially available poultry water delivery devices in the search for an alternative electronically controlled design, innovative fork lift trucks, interactive tourist information map
- experiment and create a variety of products to be used in the production of larger projects, eg spin wool, weave fabrics, develop components of a computer program 🐼
- research and present the key issues involved in different production processes and develop arguments for the most ethically viable options, eg animal health, nutrition, costs, chemical treatments and additives, housing, feed methods, human and animal rights, legislation
- investigate the implications of new methods for managing information
- research traditional Indigenous technologies, eg large scale fish traps and weir systems in riverine environments in Victoria, techniques for extracting toxins from plants to render them edible 🌀.

#### Options [Num-SM] [Num-CD]

- give reasons for choosing particular designs, eg circuitry for an electronic watering device for poultry
- experiment with models to demonstrate different methods, eg engineering a bench seat, extruders
- develop own criteria and modify own proposals, eg change land yacht design in response to availability of parts, production processes for sweet foods for 100 clients/guests, personal logos for wet suits
- identify the needs of users and actively participate in design and production processes
- examine a range of experimental techniques to select alternative and imaginative design processes, eg when decorating fabric, developing automatic door systems, self -levelling suspension for a trailer
- prepare a series of experiments that critically examine products, processes and systems, eg yarns and their use in woven and knitted fabrics, the advantages and disadvantages of chemical and organic fertilisers, models of car park barriers, remote controlled hoists 🐼
- justify choices, eg the advantages and disadvantages of a range of factors in preparing a formal meal menu
- search and research ways to improve products, processes and systems.

# Producing

## OUTCOMES

Learners demonstrating evidence of **Band 4**

- Pr 4.1 Materials**  
select from a defined range of materials, considering properties, aesthetics and origins
- Pr 4.2 Skills and Techniques**  
use appropriate equipment and practices to achieve defined standards of quality and safety
- Pr 4.3 Systems**  
organise, implement and adjust production processes.

## Links

**EsseNTial Learnings:**  
Cr 1, Cr 2,  
Constructive  
Learner


**Learning Areas:**  
HPE, Science,  
SOSE, The Arts

**Perspectives:**  
Literacy,  
Numeracy,  
Learning  
Technology,  
Vocational  
Learning

## INDICATORS

Learners demonstrating evidence of **Band 4** for example



### Materials [Sci-CC]

- choose appropriate materials to complete a task and meet design brief requirements, eg a blend of sustainable timber with concrete to create a comfortable and appealing outdoor bench, a range of nutritionally balanced and appealing foods for a child's birthday party, decorations on a pencil case
- select a range of materials to work well in combination, eg a compost mix suitable for mango production
- assess materials and products on a set of criteria, based on aesthetics, functionality, appropriateness, suitability, eg appropriate off-cuts of timber in a wooden toy, a range of finishes for environmentally friendly sign systems in school gardens
- analyse the effectiveness of the materials used and the product, process or system created, eg take into account warped timber, twisting sections and open knots when making a chopping board
- incorporate found objects to produce a piece of jewellery
- use natural materials to plan and construct manufactures that were and are used by Indigenous peoples, eg fibres, reeds, sinew to weave into fabric/string for nets, mats and baskets .

### Skills and Techniques

- demonstrate a range of safe skills to achieve set standards, eg adjust sewing machine techniques to stop slippery fabrics from puckering, clamp and cut timber to specifications using appropriate tools, use a dowelling jig to drill holes in timber for edge joining, use a blow moulder to produce a plastic dome for a ball bearing game, use a propane torch to successfully silver solder a twisted bangle
- practise and develop high standards of workmanship to industry standards, eg use a chef's knife safely to cut vegetables to specified sizes and shapes, plant native trees in industry approved ways
- vary the technology process phases when making adjustments to the design and production proposals, eg examine variables while making a pin hole camera
- listen to and view instructions and interpret into practical action using a range of skills and techniques
- vary the steps used to produce a part when a new variable is introduced, eg recognise that pre-drilling is needed on an upright when incorporating a front stay on a spice rack
- develop own design and production proposals, using skills and techniques appropriately
- trial various methods of producing desired results, eg change materials or processes as necessary.

### Systems [Sci-CC]

- select a particular system to improve an outcome (result)
- identify patterns and relationships in systems
- develop own ideas and understandings about systems, and share this information, eg the processes involved in weaving yarn into fabric, a clamping system for gluing wood for chopping boards
- use a range of energy sources to make systems work, eg solar, electrical, wind
- consider structural, mechanical, electrical, and organisational systems in different cultures  
- write own production procedure, eg make a toy of student's own design, belt and pulley transmission systems, chain and sprocket systems
- describe the sequential steps necessary when developing a useful system, eg explore options for installing software, changing a bicycle tyre
- follow commercial instructions in examining systems, eg a commercial pattern to produce a pair of boxer shorts, furniture glues and finishes.

# Producing

## Links

**EsseNTial Learnings:**  
Cr 1, Cr 2,  
Constructive  
Learner

**Learning Areas:**  
HPE, Science,  
SOSE, The Arts

**Perspectives:**  
Literacy,  
Numeracy,  
Learning  
Technology,  
Vocational  
Learning

## OUTCOMES

Learners demonstrating evidence of **Band 5**

### Pr 5.1 Materials

select appropriate materials with understanding of properties, aesthetics, economics and sustainability

### Pr 5.2 Skills and Techniques

demonstrate high level skills using specialised equipment to produce to specified standards of quality and safety

### Pr 5.3 Systems

organise, implement and adjust production processes to defined standards of quality.

## INDICATORS

Learners demonstrating evidence of **Band 5** for example

### Materials [Sci-CC]

- test a particular material based on efficiency of production and justify its choice, eg appropriate mulch material for landscaping projects
- specify desired materials to complete task, eg specify each part of a watering device that is reliable, efficient and portable
- assess materials and products to a negotiated set of criteria, based on aesthetics, functionality, appropriateness and suitability, eg discard knotty timber, 'sun smart' protective garment fabrics, fast food products
- analyse the effectiveness of materials used in products, processes and systems, eg give reasons for selecting a particular construction material for a collapsible barbecue stand, select timber for a coffee table based on its workability, looks and origins.

### Skills and Techniques

- practise and develop a repertoire of good skills and techniques that allow for high quality work, eg a blouse with collar and buttons sized to fit client, a wooden container to specified size using through dovetail joints, pruning to industry best practice
- use equipment suited to the task and to a high standard of safety and workmanship, eg specialised drill, rivet and weld techniques to construct aluminium can crusher parts, garnishing tools to create complex garnishes for main meals, scissors or rotary cutters
- manufacture a product using a range of techniques to meet a timeline and to negotiated standards, eg a sliding door
- consider how systems affect the management processes at a local and global level
- devise and implement a production process for a mass produced piece of furniture with a design team
- assess the group negotiated tasks to own criteria, eg working relationships, group productivity **[Col 3]**
- read, understand and follow 'do-it-yourself' books, eg make a coffee table, a child's garment, a soft toy or tactile art, switching circuits
- vary the problem-solving techniques used to suit the contents of the design brief, eg use appropriate tools and equipment to suit technology in design brief
- define the roles and contributions each member of a team has made in the production of a product or system.

### Systems [Sci-CC]

- organise, implement and report on a system to satisfy design brief requirements, eg drenching program for goats and follow up monitoring procedure of their health status, computer controlled toy
- examine the effectiveness of common systems, and develop understandings to share with other learners, eg accurately control and sequence the movements of a robotic arm, develop skills in 'mise en place' (preparation) to produce meals, tie dye a quantity of t-shirts
- modify a production process as necessary, eg prolong the shelf life of food without the use of chemical additives, change an energy source to a more appropriate one for the technology
- identify and justify the steps essential to effective systems.

# Producing

## OUTCOMES

Learners demonstrating evidence of **Beyond Band 5**

### Pr 5+.1 Materials

explain properties and structure of materials in terms of function, aesthetics, economics and environment

### Pr 5+.2 Skills and Techniques

use specialised skills and modify techniques and apparatus to achieve specified functional and aesthetic outcomes

### Pr 5+.3 Systems

modify techniques to assemble and control complex systems to meet performance requirements

## Links

### EsseNTial Learnings:

Cr 1, Cr 2,  
Constructive  
Learner

### Learning Areas:

HPE, Science,  
SOSE, The Arts

### Perspectives:

Literacy,  
Numeracy,  
Learning  
Technology,  
Vocational  
Learning

## INDICATORS

Learners demonstrating evidence of **Beyond Band 5** for example

### Materials [Sci-CC]

- examine and explore the properties of various materials, assessing their potential uses and operations, eg packing, materials, storage and transport requirements to meet export specifications for rambutans
- specify preferred materials in processes, products and systems created, eg a comparative table of evening dress fabrics, open loop or closed loop control systems
- devise specific equipment for working with materials
- experiment with the use, amalgamation and fusion of various materials, eg jewellery
- report on the suitability of materials used, eg lettuce varieties for a new salad, using texture, taste, aesthetics, availability and crispness; strength of knock-down fittings for a piece of furniture
- use a variety of materials to create an innovative, original or functional product explaining and justifying the various materials used.

### Skills and Techniques

- use equipment and tools safely and to industry standards, eg produce a dovetail cutting jig for use on a table saw
- use equipment to manipulate materials to design specifications
- use specialist skills and developed technique effectively, eg pre-harvest, harvest and post harvest mangoes, use a scripting language to produce a sub-routine in a database
- produce products and systems to detailed specifications and to high standards of workmanship
- analyse the process of developing design briefs and proposals, and share this information with others
- manage people, resources and equipment to facilitate the desired results
- develop own materials, resources or processes as necessary to assist production processes, eg two jigs to test for the most efficient drilling procedure in production of a sideboard.

### Systems [Sci-CC]

- use results of data to modify or improve processes or systems, eg the performance of gears, brakes and propulsion systems of a human powered vehicle, streamline the cleaning system in a food and beverage service, fine tune the reactive times of an automatic verandah light
- prepare a report giving specifications and justifying choices made, eg a low-voltage light system activated by opening a cupboard door
- devise and develop an effective production process or system, eg sustainable agriculture in the NT that meets organic certification criteria
- experiment with and trial systems to produce or create alternatives, eg original film and editing techniques, self-balancing crane
- explore alternative energy sources and debate the advantages and disadvantages
- analyse the control of systems in particular environments
- explain and implement a process or system aimed at creating a new product or solution to an existing challenge, eg recycling project



## Critiquing

### Links

#### EsseNTial Learnings:

In 1, Cr 1, Cr 2,  
Constructive  
Learner

#### Learning Areas:

HPE, Science,  
SOSE, The Arts

#### Perspectives:

Literacy,  
Numeracy,  
Learning  
Technology,  
Vocational  
Learning  
Indigenous



### OUTCOMES

Learners demonstrating evidence of **Band 4**

#### Cr 4.1 Evaluate

reflect on and assess products/processes/systems according to specified design requirements

#### Cr 4.2 Impact

consider the appropriateness and effects of products and systems on community/environment

#### Cr 4.3 Communicate

explain and present design proposals incorporating appropriate technical terminology.


### INDICATORS

Learners demonstrating evidence of **Band 4** for example

#### Evaluate [Sci-WS]

- contemplate alternate approaches when a first approach doesn't quite work out, eg Technic Lego, electronic circuitry, software applications, design problems
- consider the similarities and differences in products, processes and systems and evaluate according to criteria, eg plantation timber or imported hardwood for spice holders, labelling and packaging of biscuits
- examine products/processes/systems in terms of function, performance, quality and safety, eg ball bearing game, production of child's garment, drenching/pasture management program on goat health
- measure the performance of systems, using own devised methods and standards
- reflect on design brief requirements using self/peer/teacher comments, eg prepare and make a pizza
- use information from journal (self/teacher comments), eg suggest changes to pencil case construction
- reconsider own design ideas after feedback and constructive criticism.

#### Impact [LT-S]

- assess ethical and environmental aspects of an intended or real product or system, eg explain why a variety of milk products have evolved from variables such as profit, health, taste and choice; the environmental impact of pre-harvest chemical applications for mangoes, rambutans and bananas
- report on the relationship between variables, eg healthy foods and healthy living based on an interview between family and friends discussing what they eat and healthy living
- weigh up the advantages and disadvantages of competing design proposals, eg digital sound recording and its associated CD label, home made or commercial food preparation for large functions, hand-made or commercially produced utensils in food preparation
- justify choices made in group decision-making, and link these choices to the end products or systems produced [In 3]
- consider the reasons for using particular systems in certain situations
- research, consider and communicate consequences, eg posters, media releases and web page production about rainforest logging, tap designs for people with impairment of the hands
- communicate with agencies operating networks that include remote Indigenous communities and fringe housing projects and determine if there are specific needs or strategies that must be put in place .

#### Communicate

[Lit-LS] [Lit-W] [LT-P]

- track the links between variables and interactions in the development of products or systems, eg write up a simple control program for the remote operation of an electric motor, produce a poster showing design elements of a pencil case
- share with teacher and peers the processes used and record the process, eg to construct a child's toy, to grow vegetables using a range of treatments such as mulch or naked soil
- create and maintain a folio to record analysis, progress and process, eg multimedia, graphics, text.

# Critiquing

## OUTCOMES

Learners demonstrating evidence of **Band 5**

- Cr 5.1 Evaluate**  
analyse, assess and modify, if necessary, the products/processes/systems involved in design and production from inception to completion
- Cr 5.2 Impact**  
report on the use of products/processes/systems and the impact on the community/environment
- Cr 5.3 Communicate**  
present own design proposal requiring technical competence of skills and adopting technical terminology to show creation and development of ideas.

## INDICATORS

Learners demonstrating evidence of **Band 5** for example

### Evaluate [Sci-WS]

- develop own criteria and use these effectively when assessing own products, processes and systems, eg quality of own constructed garment, new cake recipe
- record and use a range of criteria to evaluate, eg art displays, health/safety issues when constructing
- assess the effectiveness of operations in the production cycle, eg harvesting quality mangoes
- analyse how needs, resources and circumstances affect the development and use of technologies
- examine and explain possible solutions to problems or flaws in design, eg explain how friction can be minimised in the gearing system of a vehicle
- consider own approach to design briefs, and analyse the effectiveness in terms of value for time spent, necessity for research and investigative strategies, reflection time and production time
- compare own work with that done by others, and work produced commercially [In 2].

### Impact [LT-S]

- collect, analyse and present sequentially organised data in the development of a working process or system, eg the performance of gears, brakes and propulsion systems of a human powered vehicle; improvements in the layout and design of a local newspaper or newsletter [Num-CD]
- modify designs following assessments of performance
- analyse the advantages and disadvantages of using specific products, processes or systems, eg timber preserved with arsenic salts
- explain values within industries, eg clothing, music and recording, food handling/preparation/delivery
- compare and contrast the differences in technological systems and the consequences, eg furniture production in Indonesia compared with an Australian company
- analyse information gathered and report against specific criteria, eg gender, safety and child development issues in the creation of a toy library, the environmental impacts of mimosa in the Top End
- re-appraise original needs, opportunities and options
- reflect on the effects of a new technology on society, eg 'fad' toys, fashion innovations, communication
- examine the personal, local and global impacts of ideas and innovations
- examine the social and cultural forces that made colonial Australia reluctant to recognise, accept or adopt Indigenous technologies

### Communicate

#### [Lit-LS] [Lit-W] [LT-P]

- plan and record the design process from inception to conclusion, sharing pertinent aspects with others
- prepare detailed, researched design proposals for a range of products, eg a toy for a young child, a futuristic apparatus, a logo for a club, water pollution indicator, touch sensitive switch, electronic game
- use a folio to document the design process, eg a special purpose building or home with plan and sections, specifications and plans for a goat fence, plan and construct a garment for own use
- orally present service requirements using industry standards, eg food and hospitality project
- prepare a set of graphics (exploded isometric/orthogonal drawings), eg drawings for a coffee table [Num-SM]
- in collaboration with Indigenous people, prepare a design brief for an appropriate living space for an extended family, taking into account kinship relationships

## Links

### EsseNTial Learnings:

In 1, Cr 1, Cr 2, Constructive Learner

### Learning Areas:

HPE, Science, SOSE, The Arts

### Perspectives:

Literacy, Numeracy, Learning Technology, Vocational Learning

# Critiquing

## Links

### EsseNTial Learnings:

In 1, Cr 1, Cr 2, Constructive Learner

### Learning Areas:

HPE, Science, SOSE, The Arts

### Perspectives:

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## OUTCOMES

Learners demonstrating evidence of **Beyond Band 5**

### Cr 5+.1 Evaluate

critically evaluate the effectiveness of techniques, resources and processes used to design and produce intended product or system

### Cr 5+.2 Impact

analyse and report on the short and long term consequences of a product or process on particular environments and cultures




### Cr 5+.3 Communicate

create and present detailed design and production proposals in technical and non-technical forms, appropriate to audience.

## INDICATORS

Learners demonstrating evidence of **Beyond Band 5** for example

### Evaluate [Sci-WS]

- deal with constraints and difficulties in a pragmatic and realistic way
- assess production proposals/ implementation and develop strategies to improve techniques, eg decorated evening garment
- analyse consumer trends and their impact on production, eg examine the impact of preferences on the furniture industry, marketing techniques in the fast food industry when developing a school based fast food enterprise, dispensing machines 
- critically analyse production processes/techniques of a new commercial product, eg noni juice
- provide a critical analysis and develop a report on the suitability of products, processes and systems, eg medium density fibre board kitchens in the Top End  
- develop a realistic attitude to the development of design brief solutions, eg research and investigation strategies, design and production times, realistic reflection.

### Impact [LT-S]

- redesign techniques and procedures based on knowledge gained from experience
- assess and compare work done by self, others or produced commercially
- research and investigate how production and manufacture affects the environment, eg the effects of logging on the traditional life style of Papua New Guinea tribal communities
- investigate the impact of developing a commercial enterprise in remote communities, eg eco-tourism, bush tucker harvesting and export [SOSE- Env] 
- evaluate the efficiency and impact of short/long term production modifications, assess best alternatives
- analyse the impact of advertising and publicity on production, eg market forces of supply and demand on the manufacture of fast foods, convenience foods on the health status of adolescents
- analyse and assess the impact of community and social needs on the development and design of technologies, eg vandal proof materials in the construction of public venues
- investigate the effects of technological changes on production and use of materials in various industries, eg electronics, robotics
- examine the social consequences of the introduction of Western technology and its distribution on Indigenous communities over the past 200 years .

### Communicate

#### [Lit-LS] [Lit-W] [LT-P]

- examine and analyse the links and relationships between technology and the community or environment, eg multi-national companies promoting baby and toddler foods in third world countries
- present a comprehensive report on a design and production proposal, eg marketing a new food aimed at adolescents, an environmental impact study on stormwater run-off and pollution 
- explain a design through graphics, PowerPoint, storyboard or real products, eg surfboard design project and relevant processes/ procedures, range of sophisticated garnishing techniques for a catering function
- prepare a multi-media presentation or report, eg the viability, suitability, costing and environmental effects of their choice of possible fertilisers for an organic garden plot .